We claim:

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A rock and ore crusher comprising:

(a) a main frame,

(b) an elevator frame insertable within said main frame,

(c) power means to raise and lower said elevator,

(d) an annular chamber on said elevator frame,

(e) an impeller centered within said chamber,

(f) said impeller connected to a vertical hollow spindle with a gunlock coupling,

(g) said hollow spindle journalled in an antifriction bearing,

(h) said antifriction bearing positioned horizontally within an annular housing,

(i) said annular housing attached to an annular plate,

(j) said annular plate has connections and passage ways for lubricating oils and sealing means,

(k) cup shaped sheave attached to top end of said spindle,

(l) flexible means support said annular plate, bearing housing, spindle, impeller, and sheave,

(m) rectangular steel plate means positioned midway in said main frame,

(n) power driven lube oil pump recirculates oil to said antifriction bearing,

(o) dual power means to rotate said spindle with vee belt driving means,

(p) said power means suspended below pivotable frames,

(q) said pivotable frames pivoted by power means,

(r) a static tube centered within said spindle,

(s) said static tube suspended from a top hopper and projecting into said impeller,

(t) bypass means from hopper to chamber

(u) a hopper below said chamber and having a telescoping means within said hopper

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As in claim 1(a) a rock crusher main frame having two spaced apart longitudinal beams supported on four upright spaced apart parallel columnar beams braced longitudinally and across and having a rectangular steel plate resting midway on inward projecting flanges of

said longitudinal beams; pivotal motor bases positioned near each end of said main frame and an elevator frame positioned within said four columnar beams.

3

As in claim 2 a rectangular steel plate supports an annular flexible ring like member which in turn supports an annular plate attached to said flexible member; said annular plate is ported for incoming lube oil fittings, has oil passage ways from fittings to align to vertical oil passage ways in a bearing housing and sealing means, is ported for multiple oil drains; an annular bearing housing is attached to said annular plate; said bearing housing is drilled for oil passage ways and drilled and threaded cap screws; an antifriction bearing is positioned within said bearing housing; pressurized lubricating oil is jetted into said bearing from above and below.

4

As in claim 1(g) hollow spindle is journalled vertically within the antifriction bearing of claim 3; it extends upward a designed distance to position a cup shaped multiple grooved vee sheave to have an equal number of grooves above and below the central plane of an antifriction bearing and be attached to said sheave; said spindle extends downward a designed distance and couples with an impeller; the coupling means is a variation of a gunlock system in which outward diverging conical segments are evenly spaced apart by cylindrical segments having slightly larger arc lengths than said conical segments; means to prevent unintentional disengagement of said gunlock; threaded means to forcibly clamp said gunlock; means to engage and disengage said gunlock; said spindle has slightly diverging internal tapers each side said central plane of said bearing.

5

As in claim 4 an impeller means having a first annular plate means having a concentric opening with intermittent inward converging conical segments spaced between cylinderical segments of slightly larger arcs than said conical segments and having a second annular plate means spaced evenly apart from first annular plate by intermittent wall means joined to rectangular bar means configured to retain replacible wear resistant means; said bar means positioned near the outer perimeters of said annular plate means; said intermittent wall means have designed arc lengths and curve inward stopping a designed radius from centerline of

said impeller; flat bar means aligned to said centerline have inner edges joined to ends of wall means; said flat bar means have spaced apart bolt holes; second flat bar means of designed dimensions have elongated openings matching said spaced apart bolt holes to accommodate radial positioning are bolted to first flat bar means; second annular plate means has a concentric opening configured to retain an exchangeable wear resistant means; flat wear resistant means attachable to faces of first and second annular plate means.

6

A ring shaped member having internal threads matching the external threads of said spindle of claim 4 and an outer diameter having gear teeth; an attachable means to said spindle of claim 4 to rotate said ring shaped member.

7

As in claims 4 and 6 a manual means to rotate said gear of claim 6 consisting of a yoke like means attachable to 180° recesses in said spindle; a gear enclosure attached to said yoke at or near 90° of yoke's attachment to spindle means, a small gear joined to a cap screw is journalled in said enclosure; means to prevent gears from separating when torque by a wrench is applied.

8

A disk of wear resistant metal covers the top surface of the impeller of claim 5; said disk has camming means to move a slide means to lock and unlock said gunlock means and to protect said top surface of said impeller from abrasive wear.

9

As in claims 1(b) and 2 a rectangular elevator frame having two longitudinal **I** beams and two channel cross beams is insertable and removable positioned within said upright columns of said main frame having adjustable positioning means for both roller and sliding means that bear against said columns to restrain said elevator frame from horizontal displacement; raising and lowering elevator evenly by parallel power means connected to roller chain means engaging parallel sprocket means on short shafts journaled in self aligning bearings and joined together by a drive line and universal joints; said elevator held in working position by hooking means; said hooking means disengaged by camming means to permit lowering of said elevator; speed of elevating and lowering elevator controlled by valves.

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As in claim1(d) an annular chamber of designed depth seats on the elevator frame of claim 5 and is centered and attached to said frame; said chamber has a ring shaped bottom plate, contains multiple upstanding vanes angled to the radius of said annular chamber, a segmented wear resistant expandable ring resting on said vanes, a segment removable cover supported on a rectangular angle iron means and an outer flange means welded to the annular wall of said chamber; said segmented covers bolted to said outer flange and held by wedges against the flanges of said angle iron means; said angle iron means form a rectangular opening the perimeter of which is capped by an elastomer having channel shape.

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As in claim 6 a conical hopper means below and in contact with the bottom plate of said chamber and attached to said chamber or to said elevator frame; extending through a bottom opening in said conical hopper a stepped cylinderical member that telescopes upward into said conical hopper.

12

A hopper means above said main frame resting on extension means spaced apart a distance to allow ample clearance to install and remove vee belts driving said multiple grooved vee sheave in claim 4 both across diameter and between the top of said sheave and the bottom of said hopper; said extension means containing bypass chutes; a static tube flanged at its top end suspends through the hopper bottom and through said hollow spindle of claim 4 into said impeller of claim 5; vane like air valves adjusted by exterior means are positioned within recirculating ducts.

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Motor bases equidistant from said spindle and supported on flanges of said longitudinal beams of said main frame pivot on one beam and rest on rollers on other beam; said motor bases consist of flat plate means depending beam means welded to flat plate means; flat bar means reinforce flat plate means from deflecting forces; adjustable stabilizing means hold plate means against tipping forces; power means joined in parallel push-pull said bases to

tension and remove tension of multiple vee belts that transfer motor torque to said cup shaped sheave attached to said spindle in claim 4; means to maintain proper belt tension in push mode.

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As in claim 1(n) a lubricating system consisting of an oil reservoir, an oil line to a pump said pump connected to a small motor having shafts at both ends; universal joints, a slip shaft, and an overrunning clutch join said small motor to a spindle journalled in a bearing housing attached to the top surface of one of the motor bases of claim 13; a vee belt sheave on said spindle one or more vee belts from said vee sheave to a similar sheave on the shaft of one main power motor; said bearing housing configured to be moveable to obtain belt tension; flexible oil lines from pump to connect to said annular member of claim3 that is ported to receive said oil lines; drain lines from said annular member to said oil reservoir; small motor powered at startup power disconnects when main motors reach full speed.

15

A swingable boom vertical pivoted in bearing means that accommodate vertical raising and lowering said boom, said boom having a radius from said bearing means to the vertical centerline of an annular cradle at the end of said boom to the centerline of the spindle of claims 1(g) and 4, jacking means to raise and lower said boom, booms on each side of main frame means when specified.

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In combination a base frame supports a bearing housing attached to an annular member having oil line connecting means, having labyrinth sealing means, and is attached to flexible supporting means; said flexible supporting means attached to a plate means spanning between longitudinal beams; a hollow spindle journalled in an antifriction bearing axially retained in said bearing housing; a cup shaped multiple grooved vee sheave attached to top face of said spindle; labyrinth sealing means between rotating means and companion static means; lubricating means jet oil into said bearing from above and below said bearing; an impeller joined to said spindle at its lower end by an interlocking means of intermittent conical segments; stop means at trailing ends of spindle's conical segments; radial sliding stop means within grooves in annular top member of an impeller; camming means to move

said sliding stop means inward and outward; geared rotating means to rotate geared nut means to clamp said impeller firmly to said spindle; a static tube means descends from a top hopper means through said hollow spindle into said impeller a designed distance; an annular chamber of designed depth encloses said impeller; said chamber contains multiple vanes, a segmented wear protector means and supports a segmented top cover means; channel rubber means seal camber against plate means that span across said longitudinal beams; an elevating frame raised parallel timed power means and lowered by gravity supports said annular chamber; self attaching hook means hold elevator at its top position; hooks unlocked by camming means elevator lowers to a resting position of said chamber seating on longitudinal spacing beams of main frame; a conical hopper under said chamber having a telescoping member; a swingable boom having a cradle means is used to position impellers to be connected to said spindle or to remove impellers; said boom is raised and lower by manual jacking means; two opposed power means suspend from pivoting bases an equal distance from said spindle; multiple vee belts transfer motor power to an inverted cup shaped sheave attached to said spindle; power means to tension vee belts an retain tension; power means to retract said bases; means to stabilize said bases on rollers and spaced apart adjustable means; bypass means to transfer material overflow in said top hopper into said chamber and air ducts with volume control vanes to recirculate air pumped by impeller; light weight covers over said main frame each side of said top hopper